

## **REMARKS/ARGUMENTS**

### **Drawing Amendments**

Figures 1, 4 and 6 have been replaced with clearer versions.

The Applicants submit that no new matter has been added to the drawings by the present amendment and the drawings submitted herewith are supported by the application as filed. Entry of the drawing amendments is respectfully requested.

### **Claim Amendments**

By the present amendment, the subject matter of claims 2 and 3 has been incorporated into claim 1. Claims 2 and 3 have therefore been cancelled herein. Claims 5 and 7 have been amended to depend on claim 1 in light of the cancellation of claim 3.

Claims 4, 9, 10, and 22-29 have been cancelled.

The claim amendments have been made without prejudice and without acquiescing to any of the Examiner's objections. The Applicants reserve the right to file any of the cancelled subject matter in a divisional patent application.

The Applicants submit that no new matter has been added to the claims by the present amendment and the claims submitted herewith are supported by the application as filed. Entry of the claim amendments is respectfully requested.

The Official Action dated May 2, 2007 has been carefully considered. It is believed that the claims submitted herewith and the following comments represent a complete response to the Examiner's comments and place the present application in condition for allowance. Reconsideration is respectfully requested.

## **Drawings**

The Examiner has objected to the drawings as Figures 1, 4 and 6 are not decipherable because the details in the figures cannot be seen and it is not clear what is meant to be shown by the figures.

The Applicants have submitted herewith replacement Figures 1, 4 and 6 in which the details of the figures have been enhanced to improve clarity.

In light of the above amendment, the Applicants request that the Examiner's objection to the drawings be withdrawn.

## **35 U.S.C. §102(e)**

The Examiner has maintained the rejection of claims 1-3, 9, 11-18 and 21 under 35 U.S.C. §102(e) as being anticipated by Um et al. (US Pub No. US2003/0124371, priority date November 8, 2001, hereinafter "Um"). The Applicants respectively traverse this rejection for the reasons that follow.

While not agreeing with the Examiner's position, the Applicants have amended claim 1, and accordingly, claims 11-18 and 21, dependent thereon, to include the subject matter of claims 2 and 3. That is, to specify that the biomolecule compatible matrix is a sol-gel derived from one or more organic polyol silanes. With respect to matrixes derived from polyol modified silanes, the Examiner alleges that polyol silanes and bis-silanes are taught as components of the hydrogel matrix on a microarray at paragraphs 0133-0135 of Um. The Applicants submit that the Examiner's interpretation of the teachings of Um is incorrect.

Um describes a substrate comprising an absorbent layer, the absorbent layer being used to immobilize an analyte (paragraph 0017). Um teaches that the adsorbent layer may be a hydrogel assembled from a combination of a hydrophobic monomer, a

hydrophilic monomer and a cross-linking agent, or from a monomer comprising both hydrophobic and hydrophilic functionalities and a cross-linking agent. It is this adsorbent layer that is swellable in water which allows the hydrogel to immobilize an analyte and therefore serves a similar function to the presently claimed "matrix". Um goes on to teach that the adsorbent layer is attached to the substrate via an anchor reagent that is covalently attached to the substrate surface and which contains within its structure a locus for attaching the hydrogel adsorbent layer (paragraph 0019).

At no point in Um is it taught that the matrix which entraps an analyte is a silica-based sol gel, let alone a sol gel derived from a polyol modified silane. Specific examples of hydrophobic monomers, hydrophilic monomers and cross linking reagents that are reacted to form the hydrogel matrixes of Um are listed in paragraphs 0068-0077 of Um. No silicon-containing materials are listed. The only time that silicon-containing compounds are mentioned is for use in the anchor reagent which serves to attach the adsorbent layer to the substrate (see paragraphs 0122-0135 of Um).

A person skilled in the art would appreciate that the hydrogels of Um and the sol gels derived from organic polyol silanes of the present application are completely different materials having completely different properties. There is no teaching or suggestion in Um of a microarray comprising spots of a biomolecule compatible matrix derived from polyol modified silanes. These latter materials provide advantages including control over pore size and the presence of polyol side product which serves to help stabilize the entrapped biomolecules.

Claim 9 has been cancelled herein, rendering the Examiner's rejection of this claim moot.

In light of the above, the Applicants request that the Examiner's rejection claims 1-3, 9, 11-18 and 21 under 35 U.S.C. §102(e) be withdrawn.

The Examiner has maintained the rejection of claims 1-3, 5-7, 16-18 and 21 under 35 U.S.C. §102(e) as being anticipated by Preininger (US Pub No. US2003/0040008, priority date April 12, 2000, hereinafter "Preininger"). The Applicants respectively traverse this rejection for the reasons that follow.

While not agreeing with the Examiner's position, the Applicants have amended claim 1, and accordingly, claims 5-7, 16-18 and 21, dependent thereon, to include the subject matter of claims 2 and 3. That is, to specify that the biomolecule compatible matrix is a sol-gel derived from one or more organic polyol silanes. With respect to matrixes derived from polyol modified silanes, the Examiner alleges that Preininger teaches arrays made of various polymeric silanes and dextrans (paragraph 0024) and in particular dextrans as a hydrogel, a type of sol gel is taught at paragraph 0024, lines 9-12. The Applicants submit that the Examiner's interpretation of the teachings of Preininger is incorrect.

The Applicants submit that the only entrapping matrix taught in Preininger comprises cyclodextran molecules (see paragraphs 0008-0016, for example). The polymeric silanes mentioned by Preininger in paragraph 24 are simply applied to the substrate as coatings to facilitate the attachment of the derivatized oligonucleotides. There is no specific teaching of polyol modified silane-derived sol gels as a matrix for entrapping molecules. The Applicants note that Preininger's mention of dextran hydrogels in paragraph 0024, does not refer to a sol gel derived from a dextran-modified silane as required by the present claims.

A person skilled in the art would appreciate that the cyclodextran matrixes of Preininger and the sol gels derived from organic polyol silanes of the present application are completely different materials having completely different properties. There is no teaching or suggestion in Preininger of a microarray comprising spots of a biomolecule

compatible matrix derived from polyol modified silanes. These latter materials provide advantages including control over pore size and the presence of polyol side product which serves to help stabilize the entrapped biomolecules.

In light of the above, the Applicants request that the Examiner's rejection of claims 1-3, 5-6, 16-17 and 21 under 35 U.S.C. §102(e) be withdrawn.

**35 U.S.C. §103(a)**

The Examiner has rejected claims 1-3, 5-7, 10 and 16-21 under 35 U.S.C. §103(a) as being obvious over Preininger as applied to claims 1-3, 5-7, 16-18 and 21 above, in view of Rubino (US Patent No. 6,584,259) and further in view of Ramsay et al. (US Patent No. 6,376,181). The Applicants respectively traverse this rejection for the reasons that follow.

The Examiner contends that Preininger teaches a sol gel matrix for the immobilization of biomolecules but does not teach the preparation of sol gels using sodium silicate as required by claim 10 of the present application or the modification of the glass microarray with glycidoxaminopropyltrimethoxysilane (GPS) as required by claims 19 and 20 of the present application. The Examiner contends that the preparation of sol gels from sodium silicate is taught by Rubino and the modification of a glass microarray surface with GPS is taught by Ramsay et al., accordingly it would have been obvious to combine the teachings of Preininger with those of Rubino and Ramsay et al. to arrive at the invention as claimed in these claims.

The Applicants have cancelled claim 10 in the present amendment rendering the Examiner's rejection of this claim moot.

As argued above, the Applicants submit that Preininger does not teach or suggest a microarray comprising spots of a biomolecule compatible matrix derived from

polyol modified silanes and this deficiency is not made up in the art by either Rubino or Ramsay et al. Accordingly, the Applicants submit that claims 1-3, 5-7, and 16-21 under 35 U.S.C. §103(a) as being obvious over Preininger as applied to claims 1-3, 5-7, 16-18 and 21 above, in view of Rubino (US Patent No. 6,584,259) and further in view of Ramsay et al. (US Patent No. 6,376,181).

In light of the above, the Applicants request that the Examiner's rejection of claims 1-3, 5-7, 10 and 16-21 under 35 U.S.C. §103(a) be withdrawn.

The Examiner has rejected claims 1-3 and 9-21 under 35 U.S.C. §103(a) as being obvious over Um as applied to claims 1-3, 9, 11-18 and 21 above, in view of Rubino (US Patent No. 6,584,259) and further in view of Ramsay et al. (US Patent No. 6,376,181). The Applicants respectively traverse this rejection.

The Examiner contends that Um teaches a sol gel matrix for the immobilization of biomolecules but does not teach the preparation of sol gels using sodium silicate as required by claim 10 of the present application or the modification of the glass microarray with glycidoxaminopropyltrimethoxysilane (GPS) as required by claims 19 and 20 of the present application. The Examiner contends that the preparation of sol gels from sodium silicate is taught by Rubino and the modification of a glass microarray surface with GPS is taught by Ramsay et al., accordingly it would have been obvious to combine the teachings of Um with those of Rubino and Ramsay et al. to arrive at the invention as claimed in these claims.

As argued above, the Applicants submit that Um does not teach or suggest a microarray comprising spots of a biomolecule compatible matrix derived from polyol modified silanes and this deficiency is not made up in the art by either Rubino or Ramsay et al. Accordingly, the Applicants submit that claims 1-3 and 9-21 under 35 U.S.C. §103(a) as being obvious over Um as applied to claims 1-3, 9, 11-18 and 21

above, in view of Rubino (US Patent No. 6,584,259) and further in view of Ramsay et al. (US Patent No. 6,376,181).

In light of the above, the Applicants request that the Examiner's rejection of claims 1-3 and 9-21 under 35 U.S.C. §103(a) be withdrawn.

In view of the foregoing, we respectfully submit that the application is in order for allowance and early indication of that effect is respectfully requested. Should the Examiner deem it beneficial to discuss the application in greater detail, the Examiner is invited to contact the undersigned by telephone at (416) 957-1683 at the Examiner's convenience.

Respectfully submitted,

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